Temperature Effects on Glue Performance and Compressive Strength of Glue Laminated Funtumia Africana

Kimeng Henry Tata, PhD
Department of Architecture,
Ahmadu Bello University, Zaria
hkimeng@yahoo.com

Ekundayo Olurotimi Olusegun
Department of Building,
Ahmadu Bello University, Zaria
rotimisegun29@yahoo.com

Prof Obuneme Godwin Okoli, PhD
Department of Building
Ahmadu Bello University, Zaria
okoli1257@gmail.com

Aaron Joseph Ango, PhD
Department of Architecture,
Ahmadu Bello University, Zaria
aaronango@gmail.com

***Abstract*: The effect of varying temperatures was investigated on the integrity of glue line and compressive strength parallel to grain for glue laminated Funtumia Africana (Ire) timber laminated with polyvinyl acetate glue. The performance of the glue line was investigated over temperatures of 0°C, 30°C, 40 °C, 50°C, 70°C, and 100°C administered to test samples over a period of 4 hours. The strength values were computed at an average moisture content of 5.6%. A mean compressive strength of 34.4 N/mm^2 was recorded at 0°C while a rise to 41.2N/mm^2 was recorded for 30°C. However subsequent decreases in mean compressive strength were recorded with increasing temperature from 30 °C to 100 °C. The highest and least mean compressive strength of 41.2N/mm^2 and 24.4N/mm^2 was recorded at 30 and 100°C respectively. The failure modes were similar over the various temperatures except for a brittle failure of both glue line and timber recorded at 0 °C due to extremely low temperature.**

Key words: Glulam, glue line, compressive strength, polyvinyl acetate glue, temperature variation, failure mode.